Record of Modification

Phase II Site Characterization Sampling and Analysis Plan Field Activities
Columbia Fall Aluminum Company RI/FS
Phase II SAP MOD #2

Instructions to Requester: **Submit to Roux RI Manager or Roux RI/FS Project Manager**
Roux RI Manager will maintain legible copies in a binder that can be accessed by personnel.

Project Work Plan/QAPP (check one):

[X] 2018 Phase II SAP

[ ] SOP (Title, # and approval date): _____

Requester: Laura Jensen, Project Hydrogeologist Date: July 31, 2018

Applicable section of SAP/SOP:

Phase II SAP, Section 4.5 (Soil Borings and Soil Sampling), subsection Dioxins and Furans outside the Rectifier Yards

Description of Modification:

Select Phase II soil borings and additional proposed soil borings will be analyzed for polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) in surficial and shallow soils.

Rationale for Modifications / Potential Implications of Modifications:

As part of the Phase II Site Characterization soil sampling program, CFAC/Roux collected surficial and shallow soil samples from eight soil boring locations outside of the Rectifier Yards to delineate the extent of PCDDs/PCDFs identified in the Phase I and to determine if the PCDDs/PCDFs are confined to the rectifier yards. This sampling was completed by Roux personnel on April 28, 2018.

The results of the sampling are presented as thematic dot maps on Plates 1, and Figures 1 and 2. Dioxins and furans were detected in each sample from outside the Rectifier Yards; indicating that these constituents are not confined to the Rectifier Yards.

CFAC/Roux reviewed the Montana Dioxin Background Investigation Report (MDEQ, 2011) to gain insight on quantified regional estimates of background concentrations. The MDEQ study indicated that dioxins and furans were detected in 123 of the 223 surface soil samples collected across Montana. Plate 2 presents the onsite data compared to the Montana Background Upper Tolerance Limit (UTL) for rural data, Montana Background UTL for urban and rural data, and Montana Background UTL for urban and industrial data. Comparison of the CFAC Site data collected inside and outside the Rectifier Yards to the Montana Background values revealed that the majority of CFAC samples contained dioxins and furans at concentrations less than the Montana Background UTL for rural and urban data. These data suggest that there could be a background contribution to dioxin and furan concentrations being detected at the Site.

Based on the above, it was determined that additional samples should be collected from other locations within the Main Plant Area, as well as one of the undeveloped areas of the Site, in order to develop a better understanding of the distribution and concentrations of dioxins and furans at the Site. In addition, dioxins and furans will also be added to the draft Background SAP prior to finalization of that document.

Proposed Modification Scope of Work:
Soil borings described in this modification are proposed with the intent to refine the understanding of the nature and extent of contaminants identified during the Phase I Site Characterization and identified based on preliminary results from the Phase II Site Characterization sampling.

To further characterize dioxins and furans at the Site, ten additional surface soil samples and ten additional shallow soil samples are proposed to be collected in the Main Plant Area/north of the Main Plant building to further characterize dioxins and furans in this industrial area, and to delineate the eastern extent of dioxins and furans along the rail. Additionally, ten surface and shallow samples are proposed to be collected in the Western Undeveloped Area to characterize dioxin and furan detections in this undeveloped area. The proposed locations of soil borings to be analyzed for dioxins and furans are attached as Figure 3. Some soil borings were already proposed for collection as part of the Phase II, and some new soil borings are proposed to be added to the scope in order to properly characterize the areas. The results of this analysis will be evaluated in the Phase II Data Summary Report.

As presented in the Phase I Data Summary Report, Phase I investigation data indicate that contaminants of potential concern/contaminants of potential ecological concern (COPCs) concentrations are greater in surface intervals and decrease with increasing soil depth. Therefore, sampling is proposed at the surface (0-0.5 ft-bls) and shallow (0.5-2 ft-bls) intervals. Samples will be collected from these intervals to characterize soil quality conditions in the surface soil and shallow subsurface soil. As described in the Phase II SAP, soil borings intended to characterize the nature and extent of dioxins and furans contamination will be completed utilizing hand augers.

Last, dioxins and furans are proposed to be added to the 30 surficial soil samples included in the draft Background Investigation SAP (currently under review by EPA/MDEQ) to characterize dioxins and furans in areas outside the Site that are unaffected by historic Site operations or other readily identifiable, anthropogenic sources of contamination. A Site-specific background value for dioxins and furans would allow CFAC/Roux to better understand the occurrence and concentrations of these contaminants in background references areas to frame the results of the risk assessment with respect to dioxins and furans. If USEPA concurs with this approach, CFAC/Roux will add this scope to the revised Background Investigation SAP. The results of this analysis will be evaluated in the Phase II Data Summary Report.

All samples will be analyzed for PCDD/PCDF via USEPA Method 8290A.

Data Quality Objectives:
The goals and scope of the additional onsite sampling to further characterize dioxins and furans were developed consistent with the DQOs outlined in the Phase II SAP.

Ten surface soil samples and ten shallow soil samples will be collected in the Main Plant Area/north of the Main Plant building, and ten surface and shallow soil samples will also be collected in the Western Undeveloped Area. Results from ten samples from each depth interval, for each of these areas, will generate COPC/COPEC concentrations for use in calculating exposure point concentrations (EPCs) based on the UCL_{mean}. Per USEPA ProUCL guidance and the Phase II SAP, ten samples satisfies the recommended minimum number of samples to calculate the UCL_{mean}. The results from the additional samples in the Main Plant Area will be combined with the Phase I and initial Phase II sampling results, for a total of 31 dioxin/furan sample locations (65 total samples) distributed throughout the Main Plant Area, far exceeding the recommended minimum number of samples.

In addition, a minimum of ten samples from both the surface soil and shallow soil depth intervals are proposed for collection in the Main Plant Area and the Western Undeveloped Area to allow for comparison to the background samples proposed to be collected from offsite reference areas per the draft Background SAP currently under review by USEPA.

It is anticipated that the number of samples described above will be adequate to evaluate human and ecological risk for all receptor types (noting that the evaluation of risks to small home range receptors will consider both maximum concentrations and point-by-point evaluations per the BERA WP). However, the adequacy of the dataset will be re-evaluated based upon the distribution of concentrations observed in the additional samples as well as based upon the results of the background study of dioxin/furan concentrations.

Samples were added to the Main Plant Area in areas of high COPC concentrations that were identified during the Phase I and Phase II to allow for further delineation of COPCs in this area. The proposed locations in the Main Plant Area are generally biased to be within locations where COPCs would expect to be present at their highest concentrations (i.e. around the Main Plant Building and near exceedances surrounding Rectifier Yards).

Additional samples were added at random locations throughout the Western Undeveloped Area to obtain better

spatial representativeness across the undeveloped area, and to characterize COPC concentrations near the Site boundary. These locations will also increase the spatial density of samples throughout the largest undeveloped area of the Site.

Based on the above, it is anticipated that the selected sampling locations will result in data that are adequate for the risk assessment. However, the adequacy of the dataset will be re-evaluated based upon the distribution of concentrations observed in the samples as well as based upon the results of the background study of dioxin/furan concentrations.

As presented in the Phase I Data Summary Report, Phase I investigation data indicate that COPC concentrations are greater in surface intervals and decrease with increasing soil depth. Therefore, sampling is proposed at the surface (0-0.5 ft-bls) and shallow (0.5-2 ft-bls) intervals, which is consistent with the first two depth intervals of other samples collected during the Phase I and Phase II of Site Characterization. Consistent with the Phase I sampling procedures, opportunistic samples may be collected if contaminants are evident at different depths if subsurface conditions indicate the presence of preferential pathways, or if subsurface conditions prevent sampling at the pre-determined depths.

Additionally, based on these vertical concentration gradients in soil, the evaluation of direct and incidental ingestion pathways within the 0-2-ft-bls interval is considered adequate and appropriate to evaluate potential exposure to burrowing terrestrial mammals in the BERA. In addition, these data will be adequate and appropriate for evaluation of potential exposure to human receptors for the exposure scenarios to be evaluated within the risk assessment.

A comparison of the Phase I and Phase II MDLs compared to the human health and ecological screening values are provided in the attached Tables 1 and 2. The results indicate that mean MDLs are below human health and ecological screening levels with the exception of the USEPA Protection of Groundwater RSLs.

As documented in prior data summary reports and Tables 1 and 2, there have been and will be some analytes for which the lowest MDLs achievable by the laboratory exceed the most stringent screening criteria. The actual MDLs achieved by the laboratory will continue to be evaluated in future data summary reports and the risk assessment, and situations where MDLs exceed the most stringent screening criteria will be discussed in the uncertainty section of the risk assessment.

The goals and scope of the additional background sampling to further characterize regional concentrations of dioxins and furans will be developed in the draft Background Investigation SAP.

References:

Montana Department of Environmental Quality, 2011. Montana Dioxin Background Investigation Report.

Duration of Modification (Check one):

☐ Temporary

Date(s) _____

Sample Numbers Affected Existing Locations – CFSB-168, 172, 188, 189, 190, 205, 206, 213, 215, 216,

New Locations – CFSB-288, 289, 290, 291, 292

☒ Permanent (Proposed Text Modification Section) Effective Date: July 31, 2018

Proposed Text Modifications in Associated Document:

This form serves to document the change as described above, no document revisions are proposed.

Data Quality Indicator (check one) – Please reference definitions on next page for direction on selecting data quality indicators:

☐ **Not Applicable** ☐ **Reject** ☐ **Low Bias** ☐ **Estimate** ☐ **High Bias** ☒ **No Bias**

Roux Project Manager Approval: Laura Jensen Laura Jensen Date: July 31, 2018
(Roux RI/FS Project Manager or designate)

EPA Review and Approval: Mike Cirian Date: 6 Aug 2018
(USEPA RPM or designate)

DATA QUALITY INDICATOR DEFINITIONS

Reject – Samples associated with this modification form are not useable. The conditions outlined in the modification form adversely affect the associated sample to such a degree that the data are not reliable.

Low Bias – Samples associated with this modification form are useable, but results are likely to be biased low. The conditions outlined in the modification form suggest that associated sample data are reliable, but estimated low.

Estimate – Samples associated with this modification form are useable, but results should be considered approximations. The conditions outlined in the modification form suggest that associated sample data are reliable, but estimates.

High Bias – Samples associated with this modification form are useable, but results are likely to be biased high. The conditions outlined in the modification form suggest that associated sample data are reliable, but estimated high.

No Bias – Samples associated with this modification form are useable as reported. The conditions outlined in the modification form suggest that associated sample data are reliable as reported.